

ESTABLISHED 1947

PAN AMERICAN fisherman

In This Issue . . .

- ★ Problems in Tuna Insurance
- ★ The Bluefin Tuna
- ★ Report from Washington
- ★ Outlook for the Sardine

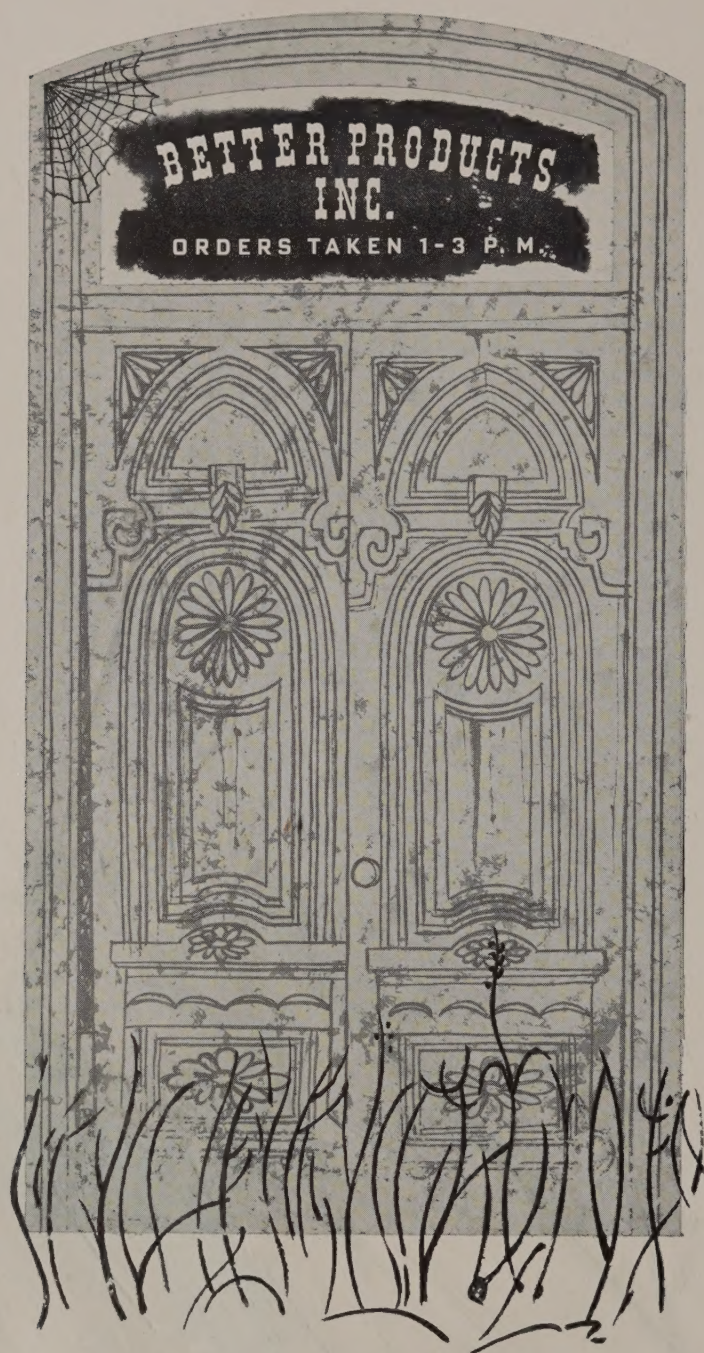


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SAN DIEGO, CALIFORNIA

Many Visitors Attracted to

FWS FISH HATCHERIES

One million persons visited the 90 fish hatcheries which the Fish and Wildlife Service operated in 1955. According to Secretary of the Interior Douglas McKay, the hatcheries are particularly popular with college and high school students of biology, nature and similar subjects, with entire classes visiting the hatcheries for on-the-spot demonstrations and lectures.

Most popular of the hatcheries is the one in Yellowstone Park. More than 250,000 persons inspected that hatchery and viewed the exhibits in the aquarium there. Next comes the Guttenberg, Iowa, hatchery and aquarium, and the Walhalla Hatchery in South Carolina; each of these drew more than 70,000 visitors.

The salmon hatcheries in the Northwest attracted enthusiastic crowds but because most of these are some distance from the regular tourist routes only about 25,000 persons actually viewed the operations during the

year. Most popular of this group was Spring Creek, near Bonneville Dam on the Columbia River, the only salmon hatchery near a beaten path. About 5,000 visitors were attracted there. Thousands more watched the fish go up the fish ladder at the dam. The Coleman hatchery near Shasta Dam in California and the Leavenworth hatchery near Grand Coulee Dam in Washington also drew many visitors considering the relative inaccessibility to the average tourist.

Those who visit trout and salmon hatcheries have an opportunity to see more hatchery work than do those who visit the warm-water rearing areas and hatcheries, officials point out. This is due to the difference in cultural methods and the general layout of the hatcheries. Warm-water fish spend much of their time in large ponds and get away from the shore whenever visitors come near. Hence, wherever possible small aquaria are maintained to permit

visitors to get a "close-up" of the fish. Salmon and trout are held in concrete ponds and are more readily seen by visitors. And since the rearing of trout and salmon is almost a continuous process these can be seen at practically any time of the year.

Western Packaging Show

A preview of the 6th Western Packaging and Materials Handling Exposition which goes into Los Angeles Pan Pacific Auditorium July 10, 11 and 12, reveals the great amount of work that both the packaging and materials handling industries have accomplished in bringing their products abreast of changing production and selling methods.

New products in both fields are being completed just in time for introduction at the Exposition. Many standard products come up this year with interesting modifications. Everywhere designers have been working to find better answers to the problems posed by automatic plants, prepackaged distribution, and higher freight rates from west coast points. More than 150 exhibitors will fill the immense Auditorium with the latest and best materials and equipment for all types of packaging.

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About This Issue . . .

BIGGEST fishery news out of the Nation's capital for a long time was the announcement by President Eisenhower that he was using his executive powers to set up a new Fisheries Bureau in the Department of the Interior, to take over the fisheries part of the present Fish and Wildlife Service.

*

The importance of giving separate status to the Fisheries Bureau will have far-reaching effect if it is properly organized and staffed . . . which we have reason to believe will be the case. You can read all about the new arrangement in "Report from Washington," starting on Page 7.

When it comes to fish production, the right word to use is "uncertainty"—especially when it pertains to sardines. They come and go—and lately there has been more go than come . . . see "Outlook for the Sardine Future" on page 12.

*

No such uncertainty exists with regard to insurance on tuna-boats. It is aimed to remove all uncertainty regarding losses to the boat owners. However, there have been too many losses recently, and you'll find some amazing facts in "Tunaboat Insurance" on page 10.

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THE BLUEFIN TUNA

By E. LAURENCE PALMER



BLUEFIN TUNA

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THE Bluefin Tuna swims in many seas and under many names. In some places it is known as the Tunny; in others, as the Horse Mackerel or Great Albacore.

The Bluefin varies in size in different parts of the world for reasons which do not seem evident. Mediterranean fishes usually run smaller than those found off the coast of New England or of California. Some Bluefin Tuna reach a length of 14 feet and weigh as much as 1600 pounds. They are among the larger fishes of the seas which they inhabit.

These marine fish are commonly found in schools ranging in size from a half-dozen to 40. Sometimes they are found in much larger groups.

Young tuna grow rapidly. A tuna egg hatched in the Mediterranean in June may be a $\frac{3}{4}$ pound fish by September. Typical growth is suggested by the following averages: 1 year, 10 pounds; 3 years, 35 pounds; 5 years, 88 pounds; 7 years, 170 pounds; 9 years, 265 pounds; 11 years, 375 pounds; 13 years, 517 pounds and 14 years, 630 pounds. There is often great difference in weight in tunas of equal length and in larger fish this may sometimes be over 100 pounds.

Bluefin Tuna are taken by harpoon, by artificial bait on hooks and by nets. They are highly migratory, favoring surface waters of 60-62° F. Rarely are they found where the tem-

perature is below 50° F. They jump freely when feeding but may or may not jump when hooked. Often they are seen splashing about on the surface for no apparent reason.

In the Bluefin Tuna, the two dorsal fins are practically continuous. They differ from the Striped Bonito and the False Albacore because their entire belly and trunk is scaly.

The back of a Bluefin Tuna is a dark lustrous steel blue to black. The cheeks are silvery and the sides silver gray, often with an iridescent pinkish sheen.

The tuna fisheries are highly organized industries and of course are seasonal in their activities because of the migratory habits of the fish. In some parts of their range they are taken incidentally but in others they provide a major source of income. The writer was once at sea with a tuna fleet and never will forget the excitement that attended their capture when a big school was found. Frequently the fleets have mother ships that freeze the fish soon after they are taken so that they can be preserved until the catch is large enough to justify a return to the cannery.

Here is a renewable resource in which the National Wildlife Federation and the lay conservationists of this country have a real interest. Wisely handled it should provide a sustained yield of wholesome food and sport for a long time. *

THE TWIN HARBORS

When you stand on a hillside in the San Pedro-Wilmington area and look out at the great expanse of the Los Angeles-Long Beach twin harbors, you're viewing one of the most wonderful, most picturesque havens in the world. And you also are seeing one of the important supports of the far-flung economic structure of Southern California.

While inspired poets may sing of the charm side, official harbor records tell an economic story that's replete with activities, colorful venturing and wide-scope achievements... a thrilling narrative in the great annals of American progress.

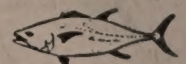
Some 11,000 factories in the Los Angeles region depend to some extent on imports and exports. Thousands of jobs result from this trade which carries the value of these ports and their services to nations throughout the world worthy of American trade.

The Los Angeles-Long Beach twin harbors also constitute a small-craft or pleasure-boat haven of outstanding importance.

Los Angeles says in a recent excellent report on that subject: "Fifteen specially equipped landings in the port now cater to the wants of pleasure-boat owners and more than 320 small craft call Los Angeles Harbor their home. Value of the port's small boat fleet is set at better than \$18,000,000 by yachting experts who point out that small-boat activities mean between \$4,000,000 and \$5,000,000 each year to the harbor area in money spent for upkeep, supplies and incidentals."

Regarding pleasure-boat visits, the article says that according to expense survey there is indicated "an expenditure of nearly \$10,000,000 annually in the port by visitors."

Yes, the twin harbors that make Los Angeles and Long Beach great seaports are magnificent and profitable not only to commercial fishermen and cannerymen—but also provide a very fine combination for all Southern California.



Report from *Washington*

Items Gleaned from the Nation's Capital

NEW BUREAU OF FISHERIES.--A White House announcement on June 4 announced the creation of a new government "Bureau of Fisheries," effective July 1, 1956. The administration has requested the Congress to enact proper legislation "to support and implement" this new Bureau.

The announcement stated that the administration has been making an intensive study of the fisheries situation for the past several months, and expects to take the necessary steps to benefit the United States commercial fishing industry.

In view of the importance of this subject we are reprinting below the exact explanation of it as stated in the government bulletin, giving the two first steps in the program.

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OFFICIAL CREATION OF BUREAU:--"First, Department of the Interior officials will undertake immediately the necessary preliminary steps for the creation within the Department of a new bureau with sole responsibility for federal programs related to the fisheries. The new bureau, which will be called the Bureau of Fisheries, will come into existence on July 1, and will take over administration of all fishery responsibilities now vested in the Fish and Wildlife Service.

"Secondly, the administration will request Congress to enact into law a comprehensive commercial fisheries program which will provide a road charter for the new agency. The administration bill, which in some respects is modelled after the so-called Saltonstall-Kennedy Act due to expire next year, would authorize the Secretary of the Interior to conduct needed investigations and research into all phases of fishing activities including oceanographic, biological, statistical, and economic studies of the distribution and abundance of fishery resources, the development of new and improved methods of fishing, and the development of improved handling methods and techniques. In addition, the bill would authorize research into the nutritive value of fish and fishery products, and many other activities designed to promote the flow of fishery commodities in domestic and foreign commerce.

"The provisions of the Saltonstall-Kennedy Act dealing with the transfer of certain funds from the Department of Agriculture under Section 32 of the Act of August 24, 1935, would be continued on a permanent basis and the present \$3,000,000 limitation on expenditure of these funds could be removed.

"Finally, the administration proposal includes the establishment of a special \$10,000,000 revolving fund to be used to make loans for the maintenance, repair, and equipment of fishing vessels. Loans made from the fund will carry interest rates of not less than 3% and could be made for periods of up to ten years.

"Implementation of these proposals will strengthen the Government's efforts to assist the fishing industry and underlines the administration's desire to give greater recognition to the vital role the United States fisheries play in the Nation's economy."

--O--

A WELCOME SURPRISE.--The White House action mentioned above came suddenly and without any previous indication that such action was imminent . . . and turned out to be a welcome surprise to all fishery interests.

Actually, the commercial fishing industry has not been happy for some years about its rather subordinate spot in the government setup . . . ever since the old Bureau of Fisheries was consolidated with the former Biological Survey and made into the present Fish and Wildlife Service.

It is understood that the new Bureau of Fisheries is being created by powers vested in the President through administrative procedures already provided by law. The other recommendations, covering the enlarged budget and various money usages, will require legislation by the Congress. However, insiders think that since the President has taken the lead the legislators will now quit dragging their feet on measures to benefit the fishing industry.

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OTHER BILLS BEING CONSIDERED.--The House Committee on Merchant Marine and Fisheries is continuing its consideration of the various fisheries bills and legislation, even though the White House has announced the administration's plans as outlined above. This may mean a combination of the various measures finally will be effected . . . and the least that can happen now is a definite step forward for the fishery interests.

Senator Magnuson's amended bill (S. 3275) jointly sponsored by Senator Kuchel and 35 other Senators, and endorsed in the House by Representatives King and Wilson of California, now overlaps some of the provisions of the White House program . . . but there is a good chance that it will be passed with some modification before the Congress adjourns for the summer.

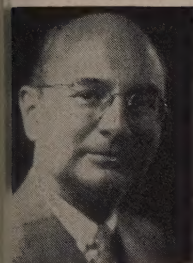
Meanwhile, latest bill to go into the hopper is sponsored by Congressman Herbert C. Bonner (N.C.), Chairman of the House Merchant Marine and Fisheries Committee. His bill (H.R. 11570) provides, among other things, a "Fisheries Service" and a "Wildlife Service" in the Department of the Interior. It would change the Magnuson bill, as passed by the Senate, by eliminating the proposed "Fish Commission" and in its place would provide for an Under Secretary of Fish and Wildlife and the two divisions mentioned above, each with a director and two Assistant Directors.

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FISHERIES EDUCATION BILL.--Head man of the National Fisheries Institute, Charlie Jackson, recently appeared before a House Committee in support of the educational facilities for young fishermen provided in two bills now being considered . . . H.R. 10433 by Congressman McCormick (Mass.) and similar bills, and S. 2379 which recently passed the Senate.

Included in Mr. Jackson's statement were these points: "Following World War I the United States Government found itself in the position of

(Continued on page 1)



The Publisher's Page



Government Recognizes Fisheries.—Best fisheries news in long time, out of the Federal government in Washington, is the announcement from the White House that several helpful steps are about to be taken.

First, a new Bureau of Fisheries is to be established on July 1—giving this industry complete and separate recognition and no longer just a branch of the Fish and Wildlife Service.

Second, the White House will ask the Congress to place the Saltonstall-Kennedy Act on a permanent instead of a year-to-year basis and eliminate the present financial limitations on the budget for this work.

Third, a special ten-million-dollar revolving fund will be requested by the President, authorizing loans up to 10-years on fishing vessels.

Some other plans and several bills are also in the works, with additional action expected before the Congress adjourns. More complete information will be found in our regular "Report from Washington," beginning on page 7 of this issue.

Trouble in Paradise?—The last few months have shown declines in some important industries, notably the automotive, steel and textiles. Unemployment is a little higher than it has been for several years.

So the faint-hearted have started to holler uncle . . . they're afraid business is going to drift downward in all lines. However, the people who seem soundest to us are the ones who point out that a little breathing spell at this time will prove beneficial rather than harmful to the general economy; things were booming along too fast and heading for more inflation.

Our favorite economist says that we are due for a short "resting period" wherein some businesses will just mark time and others may continue to show slight declines . . . but there will be no major upheaval serious enough to be considered a depression—not even a "recession" except in a few lines recently overdone.

Business usually turns up in the late summer, getting ready for the fall and winter buying. That seems to be a reasonable assumption this year—even more certain than usual because this is a national election year and it is important to the party in power to have everything running along in tip-top shape by fall.

What Reader's Digest Says.—"The Fantastic Farm Mess" is the eye-catching title of an article by John Strohm in the April issue of The Reader's Digest. It is interesting to all food producers, including fisheries, because it will affect prices. A writer of long experience on agricultural subjects, Mr. Strohm describes the present situation in these words:

"In a costly but futile attempt to support farm prices near the levels guaranteed to farmers during World War I, the U.S. Government has succeeded only in amassing

an eighteen-billion-dollar hoard of food and fiber which can't be eaten, used, sold or given away. And as surpluses have skyrocketed, farm prices have tobogganed. It's a grim example of what Government can do TO you while trying to do something FOR you."

The farmers aren't to blame—they were led into the mess by government policies and they should have help getting out. A basic trouble is that so many false ideas about the farm program are now widely accepted as gospel.

One is that price supports rescued farmers from the depression. That's false—farm prices didn't start moving up until 1940, when the impact of war and inflation set in.

Another is that a simple farm law can solve the problem. False again—for different kinds of farmers, in different places, all have different problems. You can't treat everybody that's sick with the same medicine.

America's eating habits have changed, too. We eat far less starchy foods and more fish, meat and dairy products, among other things, than we used to.

Want to be an Executive?—Somebody sent us this clipping recently, and we like it well enough to pass along to all those trying to run a business these days:

As nearly everyone knows, an Executive has practically nothing to do except to decide what is to be done; to tell somebody to do it; to listen to reasons why it should not be done; why it should be done by someone else; or why it should be done in a different way; to follow up and see if the thing has been done; to discover that it has not; to inquire why; to listen to excuses from the person that should have done it; to follow up again and see if the thing has been done—only to discover that it has been done incorrectly; to point out how it should have been done; to reflect sadly that one could have done it right in 20 minutes and, as things turned out, one has had to spend two days to find out why it has taken three weeks for somebody else to do it wrong.

Bull Story . . . with a Moral!—Once upon a time, there was a large, beautiful lion who lived in the grassland at the edge of a jungle. It was the lion's habit to range far and wide hunting for a meal that was just a little bit better than the other lions could find. One day, he found a pasture where several head of cattle were peacefully grazing. The lion selected the fattest bull in the pasture, killed it and ate his fill. Returning to his familiar haunts, he began to roar at the top of his voice to tell all the other lions about his excellent meal. A hunter hearing the lion's roar, crept within easy gun range of the King of Beasts. Drawing a steady bead on the lion's beautiful head, he shot. The lion dropped to the ground, dead . . . Moral: If you're full of bull, you'd better keep your mouth shut.

BRIANT SANDO

WITH the basic economy of the tuna fleet pretty low, the high cost of tunaboat insurance is certainly no help. We hope that a realistic look into this situation may be useful in minimizing this cost for the future.

In forecasting the future it is essential to review the past. The tabulation below shows the conventional tuna clippers lost during the ten years 1946 through 1955, excluding all partial losses and omitting vessels of less than 60 feet registered length, purse seiners and others not classified as conventional clippers:



The St. George Was Lost in 1954

Problems in . . .

TUNABOAT INSURANCE

TUNA CLIPPERS LOST

1946—Triunfo	1952—Morning Star	1954—Sun
Shangri-La	Senorita	Voyager
1947—Sun Beauty	Sun Jewel	St. George
Lisboa	Linda Jo	Santa
Viking	Sao Joao	Barbara
El Dorado	Lady Ann	Anna M
Costa Rica II	Sea Wolf	Donna M
1948—Madelyn R	North Star	Gulf Star
Sun Maid	Emma R S	Calistar
America	Olympic	1955—American
1949—Liberator	Steven L	Clipper
Rajo	Senator	Genevieve H
Conqueror	Miss California	Sea Lark
American	Princess Pat	Kathryn
Belle	Atlantic	Northern
Sun Valley	Coronado	Light
Dominator	Aztec	Western
1950—Jimmie Boy	Amor da Patria	Pacific
Glory of the Sea	1953—Manabi	La Playa
Southern	(Ex-Yvonne)	Marylin
Cross	Sonja	Rose
Wilmar	Mona Lisa	Ocean Pride
Olympia	South Pacific	Sun
Dependable	Star of the Sea	Traveler
1951—American	(Ex-Commodore)	
Girl	Sea Lady	
Countess	Explorer	
Comet	Dorothy Lee	
	Columbus	
	City of	
	San Diego	

Underwriting Business Unprofitable

The 70 losses tabulated on this page amount to nearly \$13,000,000 with over \$7,000,000 concentrated in the last four years. The overall grand total, including partial losses, is believed to exceed net revenue to underwriters after lay-up returns, commissions, taxes, surveys and other expenses. Many underwriters have felt that the insuring of tunaboats was basically an unsound venture and have dropped out of the market.

During the past two or three years some factors relative to safety at sea have improved, to be sure, but other factors have increased underwriting risks. One of the most disturbing elements has been the decrease in the amount of money that some boats have had available for maintenance. In general, considering the entire fleet and the aggregate experience of all underwriters, there has been improvement in the trend.

Whenever the subject of underwriting losses is being discussed, boat owner will ask, "Then why everybody trying to get the insurance on my boat?" Ironically, this seems to be true. It must not be overlooked, however, that this competition arises among agents and brokers. Actually it is this competitive effort of agents and brokers which has been responsible for holding the market together.

even at times when many *underwriters* were determined to get out of the business. The tuna industry owes a debt of gratitude to these agents and brokers who "all want to insure my boat," for without them, we believe, there would be either no market for tunaboat insurance today or an extremely limited and expensive market.

What About 1956?

In regard to the present year, here is the picture as we see it:

1. All of us connected with the tuna industry would like to believe that fewer boats will be lost in 1956. Against this wishful thinking, however, we must consider some facts which are not too encouraging. While some vessels are in an excellent state of maintenance, others have suffered because of financial difficulties. Furthermore, the problem of inadequate engine room watches still exists on many boats and the risk of total loss by fire is still great. If the law of averages continues to work in 1956 as it has in the past, we shall again have unfortunate losses during 1956.

2. There may be further adjustments in the number of underwriters interested in tunaboats.

3. In spite of the great need for

lower rates, we see no hope of a general reduction in 1956. It is more probable that we shall face a gradual hardening of rates during the year, reflecting the poor loss experience previously discussed.

4. Some of the boats will save money by buying *less* insurance; also by taking higher deductibles.

5. Some of the marginal boats will find it increasingly difficult to buy insurance except on restricted conditions and at higher rates.

6. There will be a growth in efforts and cooperation on the part of all interested parties toward reducing losses. This will include owners, brokers, underwriters, surveyors and others. The U.S. Government will also contribute through the study of fishing craft insurance currently underway at Boston University under the Saltonstall-Kennedy Act.

7. Among the first developments resulting from this cooperation will be steps directed toward reducing fire losses, which have accounted for about 40% of past losses. These developments will probably include the following:

- (a) A fire-detection system which

will cost a few hundred dollars per boat but will ultimately save the fleet several hundred thousand dollars per year.

- (b) A program of personnel training in fire fighting.

Beyond 1956—What?

Just as every cloud has a silver lining, 1956 could be a turning point for the better in tunaboat insurance, even though losses do not materially decrease. The seriousness of the situation, leading as we believe to greater cooperation among all interested parties, will probably bring about the corrective measures dictated by the unfortunate losses of the past. If these lessons of the past are taken to heart in 1956, this year will indeed have been a favorable turning point.

Beyond 1956 we see safer boats, improved seamanship and, eventually, a significant reduction in the cost of tunaboat insurance. This should be a worthwhile objective, considering the large segment of tunaboat income which is presently expended for insurance. The ultimate reduction in this item of expense could prove to be a major factor in solving the economic problems of the tuna fleet. *



A Casualty in 1953



Progress Report on . . .

Outlook for the Sardine Future

*Based on Co-operative
Oceanic Fisheries Investigations*

THERE are relatively few species for which the prediction of future catches has been attempted. There are few if any records of long periods of successful prediction for any species. There is no such record for the sardine, for the very good reason that the information necessary to successful predictions has not been, and is not yet, available.

Information Necessary for Prediction

If we wish to successfully predict the catch of a species we need information of the following five kinds:

(1) Fishing Effort

In order to predict the catch we obviously need to know how much fishing effort is to be expended in making that catch. It is probably fairly easy to estimate this quantity, drawing upon knowledge of the amount of effort expended in previous seasons, information on economic conditions and on competent opinion from industry members. It is also possible to make several catch estimates, each based on a different but possible amount of fishing effort.

(2) Year-Classes Already in Fishery

We must have some information about the sizes of the year-classes which have previously entered the catch. We do not need to know the absolute sizes of these year-classes, but at least need to know the size of each year-class relative to the other year-classes. We also need to have this information over a period of years, so that we may know the rate of decline to be expected of the year-classes from each age to the next.

(3) Entering Year-Classes

The size of a year-class (or year-classes) entering the catch for the

first time will influence the catch. The direction of the influence will depend on whether that year-class is small, average or large relative to previous entering year-classes and also on whether there are few or many year-classes in the catch in any one season.

(4) Natural Mortality

We have to know what the rate of natural mortality will be, at least relative to the previous seasons. A decrease in natural mortality might be expected to increase the size of the available population (over that expected with the previously observed rate of decline) and an increase in natural mortality, by the same token, to decrease its size.

(5) Availability

As we have shown, changes in availability can have a tremendous influence on the catch. We need to know whether the fish will be available to the same extent, or to a greater or lesser extent, than they were in the previous season. While it is not essential that we know the absolute availability fraction, we at least have to know what it will be relative to the previous season.

Predictions of the Sardine Catch

In order to predict the sardine catch, we must consider each of the necessary kinds of information:

(1) Fishing Effort

The amount of fishing effort expended on sardines in some recent years has decreased, but not as much as might be expected. Since Pacific mackerel, jack mackerel and sardines may all be taken at the same time and place and with the same gear, any boat that is fishing is scouting

for all three species. When sardines become available to the California fishery as they did in the 1954-55 season, fishing effort upon sardines would be resumed. It would not immediately approach previous levels, owing to the fact that there are now fewer processing plants to handle the catch and to the fact that at present the bulk of the catch is canned and a further limit is thus placed on shoreside facilities. For example, the effort expended in the 1954-55 season was limited by economic conditions.

(2) Year-Classes Already in Fishery

The last large year-class which was in the fishery was the 1948-class and even this year-class was probably only about one-third available to the fishery. By now fish of the 1948 and older year-classes are 6 or more years of age and cannot be expected to contribute much to the fishery, owing to natural mortality. The 1949-class was very small, the 1950- and 1951-classes little, if any, larger. The 1952-class, at one month and at six months of age, was about twice the size of the two preceding ones.

(3) Entering Year-Classes

Preliminary estimates indicate that the 1953- and 1954-classes are about equal in size to the 1950- and 1951-classes.

(4) Natural Mortality

As previously indicated, natural mortality is difficult to measure, but one series of estimates arise from data collected on the scouting surveys.

(5) Availability

We have no estimate of the degree to which the population will be available in subsequent seasons.

The events of 1954 show that sardines from the central Baja California area can also spawn off southern California. Fish from the two areas cannot, therefore, be considered to belong to two separate sub-populations. The occurrence of widespread spawning off southern California in the spring of 1954 and the presence of fish on the southern California fishing grounds in the fall of 1954 were associated with certain changes in oceanographic conditions. Among the latter was the occurrence of warmer water earlier in the year than was true for immediately previous years. This condition approached, in fact, that of earlier years (1941, for example).

The presence of fish on the southern California spawning grounds and on the fishing grounds in 1954 does not represent something new. Rather, it is a return to previous conditions which were interrupted for several years. We do not yet know enough about the relationship between fish and environment to be able to do any long-range predicting, but we may be able to predict over the time from spring to fall.

In summary of the future outlook, we may state that a continued revival of the sardine industry will depend upon: (1) the production of larger year-classes at more frequent intervals than has recently been the case and (2) an increase in the degree to which the population is available to the fishery. We do not, as yet, understand the factors influencing both of these phenomena.

SUMMARY AND CONCLUSIONS

What Are the Questions?

The present crisis in the sardine industry has given rise to a number of questions, which, we believe, may be expressed as follows:

- (1) What causes fluctuations in the size of the sardine population?
- (2) What causes fluctuations in the catch of sardines?
- (3) What influence does Man have on the sardine population?
- (4) What is the outlook for the future?

What Are the Answers?

By gathering together as much published and unpublished data on sar-

dines as we have been able to, by considering these data in one body, and by drawing upon principles discovered in other fishery studies as well as other fields, we have reached what we believe to be the most complete answers to these questions that it is now possible to give. They are not offered in the sense of being final answers, but they are useful as a summary of present knowledge, as an aid in clearing up misconceptions, and, perhaps especially, in emphasizing the nature and extent of the problems remaining.

(1) Fluctuations in the size of the sardine population arise from differences between additions to the population (entering year-classes) and subtractions from it (natural and fishing deaths). Estimates of the size of the sardine population over the period 1932-33 to 1953-54 are in the order of 4 to 40 billion fish in the 1930's, 2 to 25 billion in the 1940's and 1 to 15 billion in the first half of the 1950's, with an average minimal population of about 6 billion fish.

The additions to the population,
(Continued on page 16)



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New heat evaporators transform sea water into fresh water at no fuel cost but utilizing the waste heat from diesel engines or gas turbines. Five models with capacities 300 gph up to 2100 gph now available.

"Fresh Water by the Ton" is the title of an illustrated brochure available by writing to Cleaver-Brooks Company, Special products Division, 326 E. Keefe Ave., Milwaukee 12, Wisconsin.

Suomela Promoted in FWS

Under Secretary of the Interior Clarence A. Davis announced the promotion of Arnie P. Suomela, of Portland, Oregon, from Assistant Director of the Fish and Wildlife Service, in charge of fisheries, to the recently created post of Associate Director effective May 15.

In his new capacity as Associate Director, Mr. Suomela will serve as general deputy to Director John L. Farley in directing the over-all activities of the Service including fisheries. He is considered one of the Nation's authorities on the salmon fisheries and has done extensive research on salmon in Alaska and the Pacific Northwest. During the construction of the Grand Coulee Dam he was in charge of field work in the Columbia River, particularly the "salmon salvage program" which resulted in successfully transplanting salmon that had formerly migrated above the dam.

New Direction Finder

You can say goodbye to human error when you take radio bearings with the new supersensitive Kaar 238 Direction Finder, state the manufacturers. This unit with the simplified controls allows positive and direct operation because it is completely controlled from the front panel.

Front loop panel control, with vertical compass rose, assures smooth, easy operation so necessary for accuracy. It allows eye-level mounting; helps the operator take bearings more rapidly; and permits orienting the direction finder in any position on the boat. Other features include an automatic limiter, specially shielded power supply, and a tuning meter. Write Kaar Engineering Corp., 2907 Middlefield Rd., Palo Alto, Calif.

New Lubricant for Marine Engines

A new emulsion-type lubricant, developed by Shell Oil Company engineers, is said to reduce the wear of cylinder liners of large two-stroke marine Diesel engines by as much as 70%.

Tests show that Alexia Oil A permits the introduction of larger quantities of alkaline additives and thus the new lubricant remains active for longer periods of time and neutralizes more of the harmful combustion acids.

Alexia Oil A not only prevents liner wear, but is claimed to also keep combustion-zone engine parts much cleaner. In fact, in some cases it has been noted that the oil actually has removed deposits previously left by straight mineral oils.

New Tide Tables

"Tide Tables, East Coast, North and South America (including Greenland)" for the year 1957 has just been published by the U.S. Coast and Geodetic Survey, known as Serial No. 789 the book contains 276 pages.

The new edition of Tide Tables contains full daily predictions of the times and heights of the tide at 44 reference stations and tidal differences and ranges for about 1600 other places. Principal variations in the tide from day to day and from place to place are illustrated by typical tide curves from several representative ports along the Atlantic and Gulf coasts of the United States. Included in the publication is a table of the heights of the tide at any time and tables of astronomical data giving times of sunrise and sunset, moon's phases, etc.

Copies of the Tide Tables at 50 cents each are distributed by the sales agents, district offices and the Washington office of the Coast and Geodetic Survey.



No-Slip Device

Sport fishermen everywhere, and abalone seekers along the ocean, will be interested in a new safety device called Leech-Kleet—which straps on waders and boots for wading on mossy rocks, slime, and in fast water with sure-footedness.

Special metal alloy clings to pores of smooth wet rocks. So effective, fisherman is guaranteed money back if any Leech-Kleet slips on any wet rock! Light flexible construction makes walking easy in or out of water. For full information write CMG Industries, 615 South Second, Laramie, Wyoming.

Crab Packed on Film

The packaging of cooked and frozen crab in plastic film has been introduced for the first time by Iva Wendt, Seattle fish broker and canner.

According to Wendt, the new packaging method will greatly broaden the market potential for crab, through its availability in frozen food cabinets of self-selection stores.

Sold under the "Pacific Pearl" brand, the crab is of the Pacific Dungeness variety, a prime ocean crab. The product is cooked in fresh water shortly after it is caught, placed in a brine solution and frozen.

The crab is then placed in a polyethylene film bag, which is hermetically sealed. The film used is Visqueen "C," manufactured by The Viskin Corporation, Plastics Division, Terre Haute, Indiana.

Enterprise Engine News

J. L. (Jack) Roberts, sales engineer, has been transferred from New Orleans to the Los Angeles branch office of Enterprise Engine & Machinery Co., located at 10777 Van Owen Street, Burbank, California. Named to the territory by A. Ostrander, general sales manager of the San Francisco diesel engine builder, Roberts joins Roy Holboom, Branch Manager, to provide special service to marine and tractor diesel needs. He enters Southern California marine markets with a wealth of experience in both sales and service of diesel engines.

Pink Salmon Problems

Governor Arthur B. Langlie of the state of Washington has transmitted to Secretary of State John Foster Dulles the recommendation of a 16-member advisory committee that pink salmon be made the subject of study by the United States and Canada to determine the desirability of international control of runs shared by the two countries.

The Governor appointed the committee in November 1955, following an exchange of diplomatic correspondence between the Department of External Affairs of Canada and the U.S. State Department. The former had asked that meetings be arranged for the purpose of giving immediate study of the problem of pink salmon fisheries with the view to the eventual negotiation of a convention." The matter was referred to the Governor by the State Department.

The committee, which represented a cross section of the Washington fishing industry, concluded that it

avored the inclusion of joint pink salmon controls within the existing International Pacific Salmon Fisheries treaty, which is now limited to sockeye salmon. The proposed study would be conducted by the International Sockeye Commission.

The committee recommended, however, that the "managing agency be empowered only after making the necessary study, to enact regulations for escapement, control of catch, division of catch, as well as control of fishing gear." It said the research program should be initiated under a treaty as soon as possible and should attempt to discover the full range of origin and distribution of pink salmon which may be fished in common by the two countries. The committee commented that research "should not be based upon the hypothesis that the Fraser River pinks are the most important element in the U.S.-Canadian fishery of the area," and should not be confined to treaty waters.

The treaty area for pink salmon in the ocean, said the committee, should follow along the Central California coast, the mouth of the Columbia River to Cape Cook on Vancouver Island, and the inland area should not be less than the waters now embraced under the sockeye treaty in the Strait of

Juan de Fuca, San Juan Islands and Strait of Georgia.

The committee strongly recommended that studies be undertaken to determine the proportion of pink salmon which enter the common fishery in treaty waters by moving through Johnstone Strait at the northern end of the Strait of Georgia, and that fish taken from such runs should be included in the division of catch between the countries.

Salmon Hatcheries

Washington State Department of Fisheries' 19 salmon hatcheries and rearing stations will release 33,490,000 salmon fingerlings and yearlings of all species during 1956, C. H. Ellis, hatchery research supervisor, announced today.

More than 4,000,000 of the baby salmon will be marked in various ways for experimental purposes.

Planting program is one of the largest involving reared fish in the Department's history. It will involve 24,210,000 fingerlings and 9,280,000 yearlings—including 23,440,000 fall chinook, 529,000 spring chinook, 8,676,000 silver, 520,000 pink, 250,000 chum, 46,000 sockeye and 29,000 steelhead.

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Outlook for the Sardine Future

(Continued from page 13)

or year-classes, from 1930 through 1950 have varied in minimal size from 0.01 in 1950 to 7.2 billion fish in 1939, with an average minimal size of 2.5 billion fish. The specific causes of such tremendous variation in year-class sizes are not known. Any theoretical relationship that might exist between spawning stock size and year-class size is obscured by environmental influences. One interpretation (Marr) of the data is that year-class size is a function of stock size only at, or below, the smallest stock sizes observed. An alternative interpretation (Clark) is that stock sizes below 4 billion fish produce smaller year-classes than do stock sizes above 4 billion fish. Studies of survival rate during the first month of life indicate that survival in the 1952-class was about twice that in the 1950- and 1951-classes.

The subtractions from the population (deaths) are difficult to measure. The total mortality rate increased from about 24% to 59% between 1932-33 and 1936-37, was fairly constant around 50% until about 1943-44, and fluctuated around 65% to 1952-53. Fishing mortality estimates are between 20 and 30% in the earlier period and between 50 and 60% in the later period. Natural mortality estimates are between 20 and 40% and do not appear to have changed greatly. Better estimates of mortality rates, especially natural mortality rates, are needed.

(2) Fluctuations in the catch of sardines may be caused by fluctuations in the amount of fishing effort, fluctuations in the abundance of the population, and fluctuations in the availability of the population.

Between 1932-33 and 1945-46 an increase in effort tended to result in a corresponding increase in catch and a decrease in effort tended to result in a corresponding decrease in catch. This relationship was immediate. After 1945-46 an increase in effort resulted in little or no increase in catch. Reasons for the decline in total catch are to be sought, therefore, in variations in abundance and availability.

We have already discussed under (1) above the causes of fluctuations in abundance. Estimates indicate that the population in the 1950's was one-half to two-thirds of the population in the 1930's.

Availability phenomena belong to one or another of three categories; local variations in behavior, the geographic distribution of the population with respect to the geographic distribution of the fishery, and the distribution of subpopulations (if such exist) with respect to the distribution of the fishery.

Local behavior variations may be represented by temperature-connected differences in the density of fish within schools, age-connected differences in schooling behavior and so on.

Evidence of variations in fish distribution with respect to the distribution of the fishery accrue from tagging experiments, the failure of fish to reach British Columbia in 1933 and 1939, a greater than expected number of fish entering the California catch in 1949-50 and a lesser than expected number in 1946-47, failure of a net northward movement between spring and fall across the U.S.-Mexican Boundary in 1952 and 1953 and the influx of sardines from Baja California waters into southern California waters in the spring, summer and early fall of 1954.

Differences between subpopulations, as we use the term, must have a genetic basis. There is evidence of heterogeneity in the sardine population from the existence of perhaps four spawning centers and from differences in size, in age composition, in meristic characters, in scale types and in growth rates in different parts of the population range. We do not yet know if these differences are of genetic origin or if they are induced by the environment. The events of 1954 show that the southern California and central Baja California groups are not distinct.

(3) The two possible ways in which Man may influence the population are considered. Controlling the size (age) at first capture is impractical in the sardine fishery. But sardine yield-per-recruit curves are such that the present fishery tends to produce the maximum yield (weight) per recruit.

If year-class size is not a function of spawning stock size, then controlling stock size by controlling catch could not be expected to cause the production of bigger year-classes. Estimates (based on available data) of the effect of a 300,000-ton limit

on total catch applied in 1941 show that the reduction in catch between the 1945-46 and 1949-50 seasons would have been less severe than the actual decline, but that the decline following the 1950-51 season would have been virtually as severe and as precipitous as that actually observed, and a net decrease in catch of about 1,240,000 tons would have resulted. If the natural mortality rate had been lower than that used in the previous estimate, the 1945-46—1949-50 decline in catch of about 568,000 tons would have resulted.

If year-class size is a function of stock size, then controlling stock size by controlling total catch could be expected to cause the production of bigger year-classes. Estimates (different than those preceding) of the effect of a 350,000-ton limit on total catch (including the Pacific Northwest) applied in 1941 show that the fishery could have been maintained through 1952-53 before it suffered a marked decline owing to the very low recruitment level of the 1945 and subsequent year-classes. The total tonnage taken would have approximated that actually taken by the uncontrolled fishery.

Since we do not know the validity of the assumptions on which any of these tests are based, we cannot state categorically how a fishery controlled at a fixed tonnage might have affected the sardine population between 1941 and 1953 and how much Man would have been able to harvest from that population.

(4) The information requisite to successful and precise predictions of sardine catch is not now available. The major lacks (and this suggests future emphasis in sardine research) are information about availability changes and natural mortality changes. Estimates of the relative size of entering year-classes are available but need to be refined.

Even so, it is, apparent that the will be no sudden and large revival of the sardine industry until there are a series of larger year-classes than have recently been produced and until there is an increase in the degree to which the population is available to the fishery. We cannot predict when these events will occur but there is no evidence to indicate that, sooner or later, they will occur.



assuming political and economic leadership of the World. Experience since has demonstrated that we also acquired the fisheries leadership of the World. Until 10 years ago the one and only university in the United States engaged in training fisheries personnel turned out enough men to meet the situation. But today there are simply not enough trained fisheries people available to fill the posts. In fact, great competition exists between State and Federal agencies, international commissions, and even the Food and Agriculture Organization of the United Nations, all of which in the main have drawn upon the graduates of the Fisheries School of the University of Washington.

"In a few more years many people holding responsible fisheries positions will reach retirement age, and there are no trained fisheries personnel to fill the gap. Meanwhile, the entire World is focusing its interest on the resources of the seas. Maritime nations are rapidly expanding their knowledge and are building facilities for the purpose of increasing their share of the food resources of the seas. In order to do this effectively, they have established fishery schools at the academic and vocational level to give their fishermen and processors the benefit of current information and techniques in the fisheries. In this country there is a definite lack of such facilities, and we favor providing them."

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NAVY HELP.--A broad-scale study of ocean conditions by the U.S. Navy has been suggested by Senator Thomas H. Kuchel of California as another action the Federal Government can take to assist the American tuna fishing industry in meeting intensified foreign competition.

Following up a request to Senate and House Appropriations Committees made jointly with Representatives Bob Wilson of San Diego for funds for research projects, Kuchel is soliciting the assistance of the Navy Hydrographic Office in carrying out proposed oceanographic-meteorological investigations in the Pacific from Baja California to Central Peru. The Senator said, proposing the study extend out about 1,000 miles from the mainland shores, that this area is where the large and valuable tuna fisheries operate.

"My primary interest in this project is to bring long-term aid to these tuna fishermen with the thought that a closer study of the relationship between ocean currents, wind circulation, and tuna movements in this large ocean area will enable the fishermen to lessen the length of time they spend scouting for tuna and thus cut down their cost per ton of production," Kuchel wrote Captain J. B. Cochran, the Hydrographer of the Navy.

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CALIFORNIANS IN WASHINGTON.--Attending or testifying at various government hearings, and keeping an eye on fisheries affairs in general around here recently were: Dr. W. M. Chapman, of the American Tunaboat Association, San Diego; and Donald P. Loker and Charles R. Carry, representing the California Fish Cannery Association, Terminal Island.

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JAPAN AND RUSSIA ON FISHING.--Russia and Japan are reported to have reached an agreement on fisheries treaties. Japanese fishermen can begin catching

salmon in the Northwest Pacific immediately. Agreement came about when Russia withdrew her political demands. Three agreements were signed - a 10-year fisheries treaty, a 3-year sea rescue agreement, and an interim agreement, in the form of an exchange of notes, covering the 1956 salmon fishing season. A Japanese spokesman said the exchange of notes is as binding as a treaty and allows Japanese fishermen to enter restricted areas off the Soviet-Asian coast. Japan's Agricultural Minister told reporters the exchange of notes raises the annual salmon catch for Japanese fishermen to 65,000 tons compared to the 50,000 total for Japanese and Soviet fishermen originally stipulated in a Soviet decree of March 21.

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EFFECT OF OCEAN UPWELLING ON TUNA.--A greater than usual upwelling of water in the mid-Pacific and its possible effect upon the tuna fishery of that area are being closely watched by the Fish and Wildlife Service.

The huge upwelling has occurred along the Equator, south of Hawaii. The Service is studying the temperature and chemical content of the water, the speed and direction of the ocean currents and the abundance of plankton in a 1,000-mile strip of ocean which spans the Equator southeast of the Islands. Upwelling of water is a common occurrence along the Equator but because of the potentialities of this particular action Service scientists felt it warranted attention.

The upwelling is caused by displacement of surface water by the prevailing easterly winds. This sets up vertical currents which result in transfer of fertile water from the cool depths to the surface of the sea. Because of its fertility, FAWS said, the "new" water has the ability to produce and maintain an extraordinary abundance of plankton.

The Fish and Wildlife Service has made two special studies, one on the Equator and the other at one degree north latitude to discover the speed at which the sea water was flowing away from the area of the upwelling. In this work drags were hung deep in the water from floats which were followed and checked for speed and direction.

The objective of the study is to find out where the drifting mass of fertile water, with its cargo of developing plant food, will be when it becomes a good tuna feeding ground. This should help in predicting the location of a good tuna fishing area.

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TERRITORIAL WATERS.--The grouping together systematically in a single report of all the rules adopted by it in respect of the high seas, the territorial sea, the continental shelf, contiguous zones, fisheries and the protection of the living resources of the sea, were among the tasks before the United Nations International Law Commission (ILC) at its eighth session which will end about June 29 in Geneva.

The Commission, whose 15 members are recognized international law experts elected by the General Assembly, has as its objective the promotion of the progressive development of international law and its codification. It is drafting a set of provisional articles concerning the regime of the high seas and the territorial sea, and will try to work them out satisfactorily with the various governments involved.

PROGRESS & PRODUCTION

Japanese-Russian Agreement on Salmon Fishing

Japanese fishermen can begin fishing for salmon in the Northwest Pacific immediately, according to an interim agreement in the form of an exchange of notes reached on May 15 between Soviet Russia and Japan covering the 1956 salmon fishing season. According to reports from Moscow, a Japanese spokesman indicated that since the exchange of notes is as good as a treaty it permits Japanese fishermen to enter restricted waters off the Soviet Asian coast and fish for salmon.

An official Soviet Russian radio announcement last March from Moscow stated that salmon fishing in the area of the entire Okhotsk Sea, the eastern portion of the Bering Sea, and the Northwest Pacific would be restricted between May 15 and September 15, 1956. These regulations so restricted the salmon catch to 1,000 tons or about 25 million fish. However, the May 15 exchange of notes raises the annual salmon catch for Japanese fishermen to 65,000 tons, according to a Japanese spokesman.

In addition to the interim salmon-fishing agreement, the Russian and Japanese ministers at the same time signed a 10-year fisheries treaty and a 3-year sea-rescue agreement. Both of these agreements will go into effect when the Russo-Japanese peace treaty is negotiated.

Fuel Consumption of Fishing Vessels

Fuel consumption is one of the leading cost factors in vessel operation. Moreover, as compared with such fixed expenses as insurance, depreciation, licenses and interest charges, it is one of the few costs over which vessel operators have some degree of control.

A rule-of-thumb method of fuel efficiency appraisal for a vessel operator is derived from dividing his annual catch by his annual fuel purchases. Considerations include: various tonnages, dimensions, engine power and type of fishing. By selecting a vessel with about the same characteristics, an operator can estimate approximately his vessel's fuel

consumption rate in relation to others in the industry. Such a comparison must, of course, take into consideration equal distances to fishing ground.

Sardine Catch May Be Smaller Next Season

Catches of California's once great sardine fishery may be smaller next season, as the total sardine population continues to decline, the State's Marine Research Committee was told recently by fisheries investigators of five cooperating research agencies.

The Committee, which coordinates and helps finance a Statewide research program, met in San Francisco to hear the scientists' report and pass on division of its \$100,000 budget among the five agencies.

The sardine catch for the season just ended totaled 75,000 short tons, up about 7,000 tons from the previous season. Economic factors held the catch somewhat below what the resource could have provided, the researchers pointed out.

Agencies cooperating in the program include the California Academy of Sciences, California State Department of Fish and Game, Stanford University's Hopkins Marine Station, University of California's Scripps Institute of Oceanography, and the U.S. Fish and Wildlife Service.

Pacific Halibut Fleet

Although the International Pacific Halibut Commission in its regulations for the 1956 North Pacific halibut season set May 12 as the opening date, the halibut fleet did not sail in order to begin fishing by that date. In an effort to level off some of the heavy landings, the fishermen of vessels out of Puget Sound, British Columbia, and Alaska ports voted to delay actual fishing for eight days or until May 20.

The fishermen's unions also voted that (1) halibut vessels carrying three or more men would tie up for seven days between trips to the grounds and (2) small vessels carrying either one or two men will be permitted to fish for 14 days to begin the season and then tie up and fish for alternating periods of seven days.

Trout Production Shows Big Increase

Improved management techniques are paying big dividends in the production of trout at Fish and Wildlife Service hatcheries, reports Director John L. Farley.

As examples, Mr. Farley pointed to the Leadville, Colorado, hatchery which in 1951 produced 3,163 pounds of trout but in 1955 produced 55,000 pounds, an increase of some 1,700%. Other Western hatcheries listed by Mr. Farley, with the 1951 trout production in pounds followed by the 1955 figures, include:

Ennis, Montana, 30,000—184,000
Hagerman, Idaho, 46,000—158,000
Williams Creek, Arizona, 51,000—76,000.

Two factors contributed to the tremendous increase in poundage. One of these is a heater which holds the hatchery water at the proper temperature during the winter months and makes it possible to transfer fingerlings instead of fry to the rearing ponds and lakes in the spring. The other is the utilization of the small natural lakes for rearing.

One of the objectives of trout propagation is to have the fish well into the fingerling stage by the time they are taken from the hatchery and placed in the rearing ponds. This gives them a chance to develop rapidly during the summer months, when water temperature is most suitable for rapid growth.

Trout eggs hatch and the young fish grow best in water between 50° and 60° Fahrenheit. The rule of thumb in trout propagation in relation to hatching time is "50 days at 50 degrees." In colder waters the hatching time is extended considerably.

New Equipment Catalog

A colorful new catalog includes some amusing cartoons and a special joke section entitled "Heard in the Locker Room." It shows a complete line of lockers, storage cabinets, steel shelving, work benches, etc. Each item is clearly illustrated and priced. For free copy write Precision Equipment Co., 3736 N. Milwaukee Ave., Chicago 41, Illinois.



His calling card had claws on it

LUTHER KELLY lied about his age and got into the army at 15. They sent him West in 1865, and he stayed.

He liked the wilderness. Game abounded. In Trappers' Lake, according to accounts, "trout were so thick, they obscured the bottom." He learned Sioux, but read Shakespeare and Scott.

One day, he visited General Miles, sending a huge fierce-clawed bear's paw to Miles as his calling card. Miles made him chief scout against the Sioux.

By 1885, the country was taming down, and Yellowstone Kelly left it.

Two decades later, Teddy Roosevelt praised the heroic treasurer of Surigao in the Philippines who saved the town from outlaws. Name: Luther S. Kelly.

Yellowstone Kelly's body now rests at Kelly Mountain in Montana. But his pioneering spirit lives on in today's America. For it is the trail-blazing courage of 165 million people that makes America great and provides the real strength behind one of the world's finest investments: U. S. Savings Bonds.

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Third Meeting of the Fishery Advisory Committee

THE American Fishery Advisory Committee at its third meeting, held in Long Beach, California, last month, went on record for the continuance of a balanced program of technological, economic, market development, and biological research and services through an enlarged and extended Saltonstall-Kennedy Act as the best way to aid the domestic fishing industry, State Under Secretary of the Interior Clarence A. Davis stated recently.

Established under the terms of the Saltonstall-Kennedy Act which was passed in 1954 to promote increased production and marketing of domestic fishery products, this group meets periodically to advise the Secretary of the Interior on the various research and marketing activities which the Fish and Wildlife Service is conducting under the terms of the Act.

Assistant Secretary of the Interior Wesley A. D'Ewart who is chairman of the Advisory Committee served as presiding officer during the two-day meeting. In his opening remarks Secretary D'Ewart reaffirmed the Department's determination to give all possible aid to the industry.

Reports on accomplishments since the last meeting in September 1955 were presented by Fish and Wildlife Director John L. Farley, and by A. W. Anderson, Chief, Branch of Commercial Fisheries, and by Dr. L. A. Walford, Chief, Branch of Fishery Biology.

The Committee commented favorably on the program so far undertaken but urged expansion of the activities through continuance of the Act and the provision of a substantial increase in the funds which are available annually. At present the limit of expenditures in any one year is \$3 million.

The Committee discussed a number of broad problems on production and marketing of domestic fishery products revolving essentially around two major points.

First, the problem of how to increase fish production to keep abreast

of population growth so as to maintain or increase the present per capita consumption of fish came in for considerable attention. The Committee recommended market studies to determine areas of low consumption, as well as promotional campaigns, development of new products, and improvement in quality to aid in raising the present per capita consumption figure of about 10 pounds. Emphasis on exploration of new fishery resources and the development of more efficient gear to increase production was also stressed.

Secondly, the Committee also discussed the need for a well-rounded long-range program of biological research directed toward understanding the causes of fluctuations in fishery stocks in order to explain them, to predict their occurrence, and to use such understanding for the benefit of the fishery industries.

Cannery Tour Included

While in Long Beach the members of the Committee had an opportunity to visit the world's largest tuna cannery at Terminal Island where the observed tuna canning, from the unloading of the vessels to the finished product.

The 15 members of the Committee who attended the meeting were Moses B. Pike, Eastport, Maine; James S. Carlson, Boston, Mass.; Richards Nelson, Madison, Conn.; David Hart, Cape May, New Jersey; Harold R. Bassett, Salisbury, Md.; Harry F. Sahlman, Fernandina Beach, Florida; Leon S. Kenney, St. Petersburg, Florida; Alphonse J. Weimann, Pass Christian, Miss.; Lawrence W. Strasburger, New Orleans, La.; Arthur Sivertson, Duluth, Minn.; Donald P. Loker, Terminal Island, California; Arthur H. McDonica, San Francisco, California; Thomas F. Sandoz, Astoria, Oregon; Mark L. Edmunds, Garibaldi, Oregon; Lawrence C. Calvert, Seatons, Washington.

The next meeting of the Committee will be held in New Orleans, Louisiana, in January 1957.

Washington State Seafood Production

Production of seafood in Washington State during 1955 amounted to 17,647,000 pounds of food fish and shellfish, having a wholesale value of \$33,536,000, the State Department of Fisheries reports.

Nine states and Alaska outranked Washington in aggregate landings, but the value of the state's canned and processed fish was third highest. Potential retail value was \$46,951,000. Total production was down a bit from the 1954 total because of the lower catch of sockeye salmon.

Poundage-wise, the 1955 total landings have been exceeded seven times since 1935, although the total is well above the 20-year average of 137,000,000 pounds.

Salmon fishermen landed 8,381,000 fish worth \$11,945,000 to them at an average of \$1.43 per fish. The total weight of 61,577,900 pounds was the smallest odd-year weigh-up of salmon since 1943. The most prolific species of salmon, the odd-year

pinks, produced 31,691,800 pounds, or nearly one-half the salmon weight.

Statewide salmon landings amounted to 22% of the entire United States-Alaska salmon production. The chum salmon catch was the lowest in Puget Sound history.

The otter trawl and long line fleets landed 53,216,400 pounds of sole, Pacific Ocean perch, rockfish and halibut having a processed value of \$7,855,000. Production exclusive of halibut totaled 42,078,300 pounds. Only 1954 and 1945 were better trawl years.

Shellfish production totaled 19,457,000 pounds worth \$5,997,800 when processed. This includes 10,072,800 pounds of shelled Pacific and Olympia oysters, and 6,723,200 pounds of Dungeness crabs. The crab

catch—3,606,000 in number—was the second best year since 1949. The 1954 production was 4,182,700 crabs. Other shellfish production included hardshell and razor clams, shrimp, scallops, and octopus, totaling 2,594,800 pounds.

The remaining landings of 7,904,200 pounds came from smaller fisheries on albacore, anchovies, candlefish, carp, hake, herring, shad, smelt, sturgeon and scarpfish.

The statewide canned salmon pack amounted to 613,798 48-pound cases, of which 412,159 were pinks. While the total pack was not exceptional for an odd year, it was well above the average of 578,070 cases for pink salmon years since 1935.

Puget Sound packers also processed 64,584 cases of salmon, mostly chum, imported from Alaska and British Columbia. The wholesale value of the entire salmon catch, excluding imported fish, was \$21,502,700.



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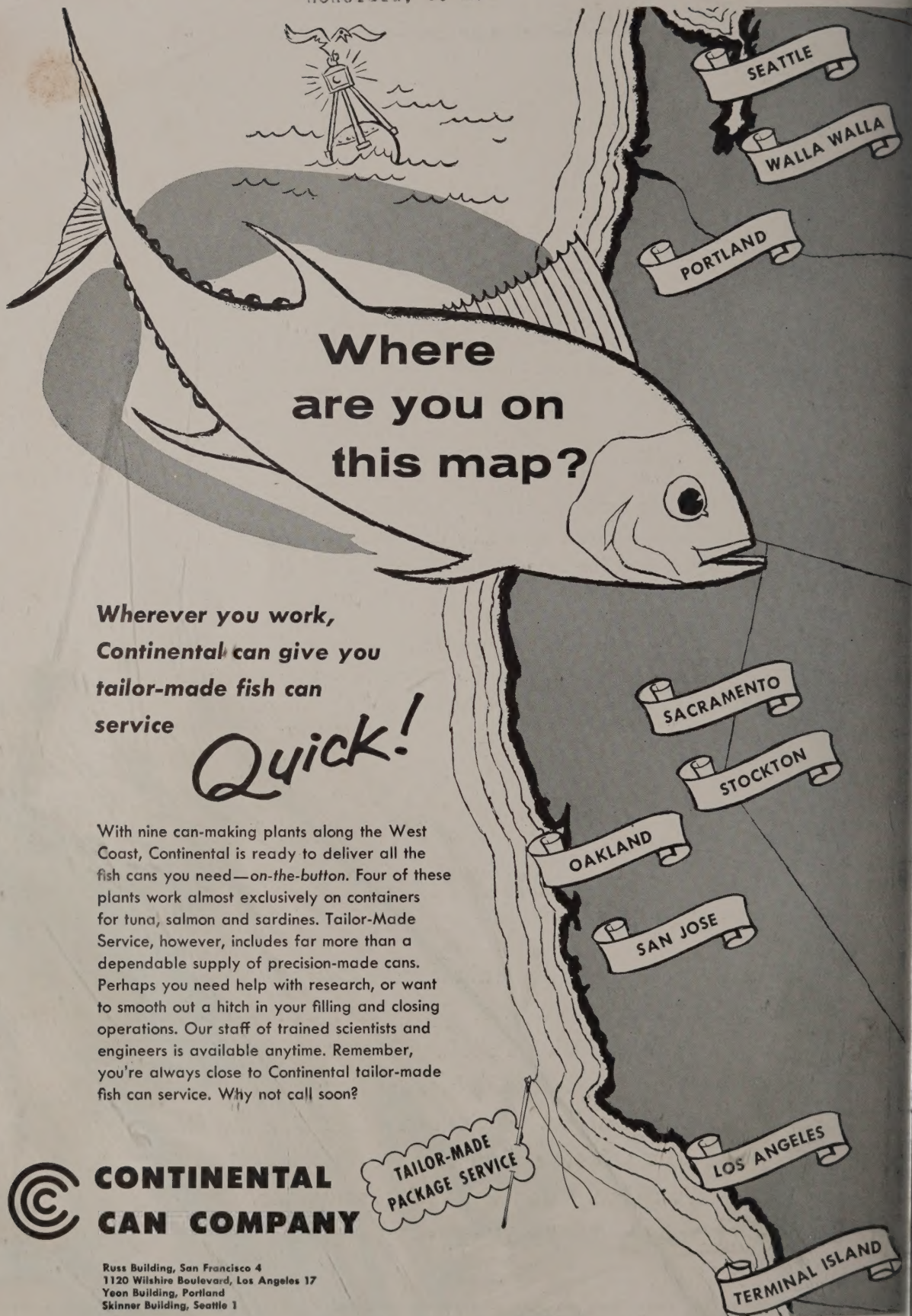
MOST fishery interests agree that things are looking up for the future. Some of our most troublesome problems are being recognized and helpful solutions searched out—by both business and government authorities. You can read about them on other pages in this magazine.

With the American economy in general on a high level, and most lines of business apparently destined to remain that way, we believe that the fisheries situation also will shape up quite satisfactorily.

Our efforts now and always are dedicated to the creation of bigger and better markets for canned tuna, and to advance the best interests of the entire tuna industry.

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